rich in pigment it corresponds to a greatly weakened light. In general the development of the plant is proportional to the dry matter produced; but growth is not exactly proportional thereto, for it is more feeble in strong light and more vigorous in weak light than it would seem if it were measured by the augmentation of the dry weight. The root and stem are unequally affected; the former grows more and the latter less as the illumination increases; but too strong a light reduces the rate of growth of both because less food is produced. The development of the leaf blades generally increases to a maximum with decreasing light, but diminishes with further enfeeblement. With some exceptions transpiration does not have any sensible effect on the total production of dry matter, though the quantity in proportion to the fresh weight generally diminishes with the diminished light.

All the green plants are capable of regulating the quantity of light absorbed, and so partly avoiding the injurious effect on production of dry matter, by altering the quantity of chlorophyll produced. These adaptations are limited in plants poor in chlorophyll; but those rich in pigment can adjust themselves to a relatively very weak illumination. Biologically the massing of plants ought to be an advantage by reducing the illumination. Physiologically the action of light is not limited to the reduction of H_2CO_3, for it affects also the speed of incorporation [assimilation] of carbohydrates. The former demands a stronger light than the latter, for which there is an optimum, and below and above this it rapidly diminishes in rate. It is by this retarding action of bright light upon the incorporation of carbohydrates and a consequent considerable accumulation of foods in the green tissues that the diminution in the production of dry matter is explicable when the illumination passes a certain limit. [This explanation does not explain and surely needs further consideration.] If the chemical transformations which constitute the incorporation of carbohydrates are of enzymic nature, it is probable that they are affected by the action of light on the formation and destruction of enzymes. [Is not the fate of the greater part of the carbohydrates to be sought rather in protein synthesis than in "incorporation;" and is there any evidence of enzymic action in this process?]—C. R. B.

Self-digestion and endospermic respiration.—The long effort to settle the question of the vitality of the endosperm, which was begun by GRIS and VAN TIEGHEM, was practically abandoned after the culminating researches of BROWN and ESCOMBE, PURIEWITSCH, and BROWN and MORRIS. Since that time very little indeed has been contributed to the subject. Perhaps one reason was that the results of somewhat related investigations so modified our knowledge of enzymes and respiration that self-digestion as a test of vitality was no longer regarded as valid. Altogether disregarding such opinions, BRUSCHI[5] takes up the problem practically as it was first attractive fifty years ago, "to solve the

[5] BRUSCHI, DIANA, Researches on the vitality and self-digestion of the endosperm of some Graminaceae. Annals of Botany **22**:449–463. 1908.

question whether the reserve material contained in the endosperm of amyliferous seeds is exclusively digested by enzymes secreted during germination, or whether the endosperm cells renew their vital activity and themselves dissolve their own food material."

The endosperms of maize, wheat, rye, and barley were tested. The seeds were allowed to soak 48 hours before removal of the embryo and scutellum in some instances, and in the other tests no statement is made on this point. No controls are mentioned; in fact the experimental data are so meager that the reader is compelled to reject the results simply because the author leaves him too ignorant to judge. In the digestion tests no controls are mentioned. The simple statement that aseptic conditions were maintained is altogether insufficient. We read that chloroform water was used, but whether it was saturated or half saturated or something else the reader cannot know. The general trend of the conclusions is that all of the endosperms mentioned are more or less capable of self-digestion, and that such activity is independent of vitality. The endosperm of rye is pronounced dead, but in maize, barley, and wheat there is more or less vitality in some of the amyliferous cells.

STOWARD[6] has found that the pure endosperms of Hordeum and Zea under appropriate conditions manifest a gaseous exchange of respiratory character. He also regards similar behavior on the part of the aleurone layer as strengthening the evidence that the cells of that tissue possess vitality. The paper is presumably an initial effort, because (*a*) the introduction as such is unnecessarily tedious, and as a digest of the literature is deficient in so far as a judicial analysis is concerned, and is not as comprehensive as others already published; (*b*) after about ten pages of tabulated data a new subject is at once begun with no discussion or consideration of the significance of the experimental results recorded. This *pot-pourri* style of composition is more or less reflected in the impression one receives of the author's tendency to think of several matters without analysis and correlation. On the other hand, all the experimental procedure is very carefully described and the reader can analyze the results. In spite of the fact that the respiration tubes were "tarred" instead of tared, one is inclined to accept the results as reliable and the conclusions as sound.—RAYMOND H. POND.

Plant diseases.—The last annual report (21st) of the Agricultural Experiment Station of the University of Nebraska, issued January 29, 1908, contains the following papers of interest in reference to plant diseases.

POOL[7] discusses several diseases of tomatoes. Black rot, due to *Alternaria fasciculata* (C. & E.) Jones & Grout, occurs on the ripe fruit at the blossom end. The cavities within the diseased tissue are lined with the fluffy mycelium of the fungus. It was isolated and inoculations were made upon both ripe and green

[6] STOWARD, FREDERICK, On endospermic respiration in certain seeds. Annals of Botany **22**:415–448. 1908.

[7] POOL, V. W., Some tomato fruit rots during 1907.